

We claim:

1. A cross-linked and cross-linkable organosilicon polymer gel comprising vinyl terminated fluorine-containing polysiloxane and a reactive polysiloxane resin having both reactive carbon-carbon double bonds and silicone hydrogen groups.
2. An organosilicon polymer gel according to claim 1, wherein the reactive polysiloxane resin comprises a silicon hydrocarbon crosslinking agent comprising alternating structures of polycyclic polyene residue and cyclic (or tetrahedral) siloxysilane residue.
3. An organosilicon polymer gel according to claim 2 comprising in the range of about 64 wt % to about 99 wt % of the vinyl terminated fluorine-containing polysiloxane.
4. An organosilicon polymer gel according to claim 3 comprising in the range of about 77 wt % to about 90 wt % of the vinyl terminated fluorine-containing polysiloxane.
5. An organosilicon polymer gel according to claim 2, wherein the vinyl terminated fluorine-containing polysiloxane is in the range of about 20 mole % to about 90 mole % substituted with 3,3,3-trifluoropropyl groups.

6. An organosilicon polymer gel according to claim 5, wherein the vinyl terminated fluorine-containing polysiloxane is in the range of about 20 mole % to about 60 mole % substituted with 3,3,3-trifluoropropyl groups.
- 5 7. An organosilicon polymer gel according to claim 2, comprising in the range of about 1 wt % to about 36 wt % of the silicon hydrocarbon cross-linking agent.
8. An organosilicon polymer gel according to claim 7, comprising in the
10 range of about 10 wt % to about 23 wt % of the silicon hydrocarbon cross-linking agent.
9. An organosilicon polymer gel as in claims 2, 4, 6 or 8 further comprising a group VIII metal catalyst.
- 15 10. An organosilicon polymer gel according to claim 9, wherein the group VIII metal catalyst is selected from the group consisting of platinum based compounds, rhodium based compounds, ruthenium based compounds, iridium based compounds, palladium based compounds and mixtures
20 thereof.
11. An organosilicon polymer gel according to claim 10, wherein the group VIII metal catalyst is selected from the group consisting of chloroplatinic acid, platinum chloride, dibenzonitrile platinum dichloride, platinum on carbon,
25 platinum on silica, platinum on alumina, olefinic complexes, $\text{RhCl}(\text{PPh}_3)_3$,

RhCl(CO)(PPh₃)₂, Ru₃(CO)₁₂, IrCl(CO)(PPh₃)₄, Pd(PPh₃)₄, and mixtures thereof.

12. An organosilicon polymer gel according to claim 9, wherein the gel
5 further comprises an additive selected from the group consisting of
antioxidants, compatibilizing agents, metallic, mineral and organic fillers, flow
control agents, air release agents, adhesion promoters, cure rate modifiers
and mixtures thereof.

10 13. An electronic sensor module containing the organosilicon polymer gel of
claim 1 as a protective encapsulant.

14. A cross-linked and cross-linkable organosilicon polymer in the form of a
rigid, cross-linked silicone, comprising vinyl terminated fluorine-containing
15 polysiloxane and a reactive polysiloxane resin having both reactive carbon-
carbon double bonds and silicone hydrogen groups.

15. An organosilicon polymer according to claim 14, wherein the reactive
polysiloxane resin comprises a silicon hydrocarbon crosslinking agent
20 comprising alternating structures of polycyclic polyene residue and cyclic (or
tetrahedral) siloxysilane residue.

16. An organosilicon polymer according to claim 15 comprising in the range
of about 1 wt % to about 40 wt % of the vinyl terminated fluorine-containing
25 polysiloxane.

17. An organosilicon polymer according to claim 16 comprising in the range of about 1 wt % to about 20 wt % of the vinyl terminated fluorine-containing polysiloxane.

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18. An organosilicon polymer according to claim 15, wherein the vinyl terminated fluorine-containing polysiloxane is in the range of about 20 mole % to about 90 mole % substituted with 3,3,3-trifluoropropyl groups.

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19. An organosilicon polymer according to claim 18, wherein the vinyl terminated fluorine-containing polysiloxane is in the range of about 20 mole % to about 60 mole % substituted with 3,3,3-trifluoropropyl groups.

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20. An organosilicon polymer according to claim 15, comprising in the range of about 60 wt % to about 99 wt % of the silicon hydrocarbon cross-linking agent.

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21. An organosilicon polymer according to claim 20, comprising in the range of about 80 wt % to about 99 wt % of the silicon hydrocarbon cross-linking agent.

22. An organosilicon polymer as in claims 15, 17, 19, or 21 further comprising a group VIII metal catalyst.

23. An organosilicon polymer according to claim 22, wherein the group VIII
metal catalyst is selected from the group consisting of platinum based
compounds, rhodium based compounds, ruthenium based compounds,
iridium based compounds, palladium based compounds and mixtures
5 thereof.

24. An organosilicon polymer according to claim 23, wherein the group VIII
metal catalyst is selected from the group consisting of chloroplatinic acid,
platinum chloride, dibenzonitrile platinum dichloride, platinum on carbon,
10 platinum on silica, platinum on alumina, olefinic complexes, $\text{RhCl}(\text{PPh}_3)_3$,
 $\text{RhCl}(\text{CO})(\text{PPh}_3)_2$, $\text{Ru}_3(\text{CO})_{12}$, $\text{IrCl}(\text{CO})(\text{PPh}_3)_4$, $\text{Pd}(\text{PPh}_3)_4$, and mixtures
thereof.

25. An organosilicon polymer according to claim 22, wherein the polymer
15 further comprises an additive selected from the group consisting of
antioxidants, compatibilizing agents, metallic, mineral and organic fillers, flow
control agents, air release agents, adhesion promoters, cure rate modifiers
and mixtures thereof.

20 26. An electronic sensor module containing the organosilicon polymer of
claim 14 as a protective encapsulant.

27. A cross-linked and cross-linkable organosilicon polymer, comprising vinyl
25 terminated phenyl-substituted siloxane and a reactive polysiloxane resin

having both reactive carbon-carbon double bonds and silicone hydrogen groups.

28. An organosilicon polymer according to claim 27, wherein the
5 polysiloxane resin comprises a silicon hydrocarbon crosslinking agent comprising alternating structures of polycyclic polyene residue and cyclic (or tetrahedral) siloxysilane residue.

29. An organosilicon polymer according to claim 28 comprising in the range
10 of about 20 wt % to about 99 wt % of the vinyl terminated phenyl-substituted siloxane.

30. An organosilicon polymer according to claim 29 comprising in the range
15 of about 60 wt % to about 99 wt % of the vinyl terminated phenyl-substituted siloxane.

31. An organosilicon polymer according to claim 28, wherein the vinyl
terminated phenyl-substituted siloxane is in the range of about 1 mole % to
about 40 mole % phenyl substituted.

20 32. An organosilicon polymer according to claim 31, wherein the vinyl terminated phenyl-substituted siloxane is in the range of about 2 mole % to about 20 mole % phenyl substituted.

33. An organosilicon polymer according to claim 28, comprising in the range of about 1 wt % to about 80 wt % of the silicon hydrocarbon cross-linking agent.
- 5 34. An organosilicon polymer according to claim 33, comprising in the range of about 1 wt % to about 40 wt % of the silicon hydrocarbon cross-linking agent.
35. An organosilicon polymer according to claim 28, 30, 32 or 34, further
- 10 comprising a group VIII metal catalyst.
36. An organosilicon polymer according to claim 35, wherein the group VIII metal catalyst is selected from the group consisting of platinum based compounds, rhodium based compounds, ruthenium based compounds,
- 15 iridium based compounds, palladium based compounds and mixtures thereof.
37. An organosilicon polymer according to claim 36, wherein the group VIII metal catalyst is selected from the group consisting of chloroplatinic acid,
- 20 platinum chloride, dibenzonitrile platinum dichloride, platinum on carbon, platinum on silica, platinum on alumina, olefinic complexes, $\text{RhCl}(\text{PPh}_3)_3$, $\text{RhCl}(\text{CO})(\text{PPh}_3)_2$, $\text{Ru}_3(\text{CO})_{12}$, $\text{IrCl}(\text{CO})(\text{PPh}_3)_4$, $\text{Pd}(\text{PPh}_3)_4$, and mixtures thereof.

38. An organosilicon polymer according to claim 35, wherein the polymer further comprises an additive selected from the group consisting of antioxidants, compatibilizing agents, metallic, mineral and organic fillers, flow control agents, air release agents, adhesion promoters, cure rate modifiers
5 and mixtures thereof.

39. An electronic sensor module containing the organosilicon polymer of claim 27 as a protective encapsulant.

10 40. A cross-linked and cross-linkable organosilicon polymer gel, comprising vinyl terminated fluorine-containing polysiloxane, vinyl terminated phenyl-substituted siloxane and a reactive polysiloxane resin having both reactive carbon-carbon double bonds and silicone hydrogen groups.

15 41. An organosilicon polymer gel according to claim 40, wherein the reactive polysiloxane resin comprises a silicon hydrocarbon crosslinking agent comprising alternating structures of polycyclic polyene residue and cyclic (or tetrahedral) siloxysilane residue.

20 42. An organosilicon polymer gel according to claim 41 comprising in the range of about 64 wt % to about 99 wt % of a blend of the vinyl terminated fluorine-containing polysiloxane and the vinyl terminated phenyl-substituted siloxane.

43. An organosilicon polymer gel according to claim 42 comprising in the range of about 77 wt % to about 90 wt % of the blend of the vinyl terminated fluorine-containing polysiloxane and the vinyl terminated phenyl-substituted siloxane.

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44. An organosilicon polymer gel according to claim 43, wherein the blend of the vinyl terminated fluorine-containing polysiloxane and the vinyl terminated phenyl-substituted siloxane comprises in the range of about 70 wt % to about 99 wt % of the vinyl terminated fluorine-containing polysiloxane.

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45. An organosilicon polymer gel according to claim 44, wherein the blend of the vinyl terminated fluorine-containing polysiloxane and the vinyl terminated phenyl-substituted siloxane comprises in the range of about 80 wt % to about 99 wt % of the vinyl terminated fluorine-containing polysiloxane.

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46. An organosilicon polymer gel according to claim 41, wherein the vinyl terminated fluorine-containing polysiloxane is in the range of about 20 mole % to about 90 mole % substituted with 3,3,3-trifluoropropyl groups.

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47. An organosilicon polymer gel according to claim 46, wherein the vinyl terminated fluorine-containing polysiloxane is in the range of about 20 mole % to about 60 mole % substituted with 3,3,3-trifluoropropyl groups.

48. An organosilicon polymer gel according to claim 41, wherein the blend of
25 the vinyl terminated fluorine-containing polysiloxane and the vinyl terminated

phenyl-substituted siloxane comprises in the range of about 1 wt % to about 30 wt % of the vinyl terminated phenyl-substituted siloxane.

49. An organosilicon polymer gel according to claim 48 wherein the blend of
5 the vinyl terminated fluorine-containing polysiloxane and the vinyl terminated phenyl-substituted siloxane comprises in the range of about 1 wt % to about 20 wt % of the vinyl terminated phenyl-substituted siloxane.

50. An organosilicon polymer gel according to claim 41, wherein the vinyl
10 terminated phenyl-substituted siloxane is in the range of about 1 mole % to about 40 mole % phenyl substituted.

51. An organosilicon polymer gel according to claim 50, wherein the vinyl
15 terminated phenyl-substituted siloxane is in the range of about 2 mole % to about 20 mole % phenyl substituted.

52. An organosilicon polymer gel according to claim 41, comprising in the
range of about 1 wt % to about 36 wt % of the silicon hydrocarbon cross-
linking agent.

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53. An organosilicon polymer gel according to claim 52, comprising in the
range of about 10 wt % to about 23 wt % of the silicon hydrocarbon cross-
linking agent.

54. An organosilicon polymer gel as in claims 41, 47, 51 or 53, further comprising a group VIII metal catalyst.

55. An organosilicon polymer gel according to claim 54, wherein the group
5 VIII metal catalyst is selected from the group consisting of platinum based compounds, rhodium based compounds, ruthenium based compounds, iridium based compounds, palladium based compounds and mixtures thereof.

10 56. An organosilicon polymer gel according to claim 55, wherein the group VIII metal catalyst is selected from the group consisting of chloroplatinic acid, platinum chloride, dibenzonitrile platinum dichloride, platinum on carbon, platinum on silica, platinum on alumina, olefinic complexes, $\text{RhCl}(\text{PPh}_3)_3$,
15 $\text{RhCl}(\text{CO})(\text{PPh}_3)_2$, $\text{Ru}_3(\text{CO})_{12}$, $\text{IrCl}(\text{CO})(\text{PPh}_3)_4$, $\text{Pd}(\text{PPh}_3)_4$, and mixtures thereof.

57. An organosilicon polymer gel according to claim 54, wherein the polymer further comprises an additive selected from the group consisting of
antioxidants, compatibilizing agents, metallic, mineral and organic fillers, flow
20 control agents, air release agents, adhesion promoters, cure rate modifiers and mixtures thereof.

58. An electronic sensor module containing the organosilicon polymer gel of claim 40 as a protective encapsulant.

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